Permit No.	Date	DIN
44-07	**May 3, 2012**	**16554**

RECEIVED
May 1, 2012
Solid Waste Section
Asheville Regional Office

FACILITY PLAN

WHITE OAK MSW LANDFILL
PHASES 1-3
HAYWOOD COUNTY, NORTH CAROLINA

MARK D. CATHEY, PE

McGill ASSOCIATES

Engineering • Planning • Finance
Asheville, North Carolina

NORTH CAROLINA PROFESSIONAL SEAL 24993 ENGINEER MARK D. CATHEY

Mark D. Cathey
3-23-12

Revised September 2009
Revised March 2012

11.00716

FACILITY PLAN

White Oak MSW Landfill
Phases 1 - 3

1.0 Site Development

The MSW Phases 1-3 Permit Amendment drawings for the Haywood County White Oak Landfill were developed in accordance with Section .1619 of the North Carolina Solid Waste Management Rules. The overall site plan for the facility is included as Sheet C1 of the Phases 1-3 Permit Amendment drawings.

Figure 2 in Section 2 of the original Permit to Construct report for Phase 3 & 4 shows the property boundary survey performed by Edward M. Haynes, P.L.S. of Herron Surveying, dated February 9, 1990. A copy of the landfill property deeds have been enclosed in Section 2 of the referenced Permit to Construct Report. Figure 1 is a summary of property information for the White Oak Landfill. Sheet C1 of the Permit Amendment drawings shows the existing topography of the site and was provided by McGill Associates in an aerial survey dated November 11, 2011. The boring locations and details that were used to produce the Design Hyrdrogeologic Report, prepared by BLE, Inc., were shown on Sheet C2 of the original Permit to Construct drawings for Phases 3 & 4. A copy of the BLE, Inc. report was submitted under separate cover and was not included in the original Permit to Construct Report for MSW Phases 3 & 4.

1.1 Landfill Units

Phase 3 consists of approximately 8.8 acres and is designed as a side-slope fill against existing Phases 1 & 2. Phases 1-3 will provide approximately 5 years of landfill airspace. Approximately 1,150 linear feet of proposed liner edge of Phase 3 will connect to the existing liner edge at the western margin of existing Phases 1 & 2. The various Phases of the White Oak MSW Landfill are illustrated on the Overall Site Plan, Sheet C1 of the Permit Amendment drawings. Phase 1-3 have an estimated remaining volume capacity of 1,047,113 CY (which excludes the 12" temporary cap). This results in an estimated life expectancy of approximately five (5) years. Capacity calculations are discussed in Section 4.2 (Landfill Capacity) of this report.

Filling of Phase 3 will begin at the access point in the southeast corner of the new phase. Filling will proceed to the north margin of the phase. Waste placement will continue in a phased manner in lifts ranging from 6 to 12 feet in height. Landfill Staff will cover the entire footprint of the new phase in its second year of accepting waste. A stormwater control liner will be utilized to segregate stormwater runoff from potential leachate. Additionally, temporary stormwater control berms will be utilized to separate stormwater from potential leachate to reduce the amount of active area in the phase at any one time. As the elevations of the phase increase, stormwater will be shed to periphery ditches to the north and west of

the new phase. Refer to Sheets C13 through C17 of the Permit Amendment drawings for the five-year permitting period filling sequence.

1.1.1 Future Expansion

Once Phases 1-3 near their operational capacity, Haywood County intends to expand the White Oak Facility by constructing additional Phases to the west and south of Phases 1-3. Approximately 29.0 acres will be included in future Phases 4, 5 and 6, with an estimated life expectancy of 27 years beyond the life expectancy of Phases 1-3. A possible development area for a future Phase 7 is available to the east.

In addition to the MSW Phases 3 through 6, the County has site study approval for additional areas of the landfill property to the east of the existing active MSW area available for landfill airspace beyond the lifetime of Phases 3 through 6.

Existing, proposed, and future landfill facilities are illustrated on Sheet C1 of the Permit Amendment drawings.

Haywood County contracted with Municipal Engineering in 1998 to prepare the "White Oak Landfill, MSWLF Facility Site Study". The report included the identification of potential landfill sites in the County, the selection of alternative sites based on County criteria and regulatory criteria, the evaluation of three alternate sites as well as the existing White Oak MSW Landfill, a presentation of the socioeconomic and demographic data, and a recommendation to further pursue the development of the White Oak MSW Landfill property. Based on this report, the White Oak site was selected.

Haywood County is considering developing plans for the implementation of a methane gas collection and combustion system. A preliminary methane gas collection system design is included in this Permit Amendment.

1.2 Buffer Zones

Sheet C1 shows the buffer requirements for the White Oak MSW Landfill. The waste limits are well away from any buffer requirements.

There are not any existing private residences or water-supply wells located within 500 feet of Phases 1-3.

A minimum buffer distance of 50 feet is maintained between the adjacent streams and waste disposal units. The installation of Phase 3 impacted 0.45 acres of wetlands and approximately 185 l.f. of stream. Permits for these impacts from the United States Army Corps of Engineers and North Carolina Department of Environment and Natural Resources were provided to the Solid Waste Section prior to the issuance of a Permit to Construct.

The nearest 100-year floodplain is approximately 1,000 feet to the north of Phase 3 along the Pigeon River. No landfill facilities will be located in the floodplain.

Refer to the Phases 3 & 4 Design Hydrogeologic Report prepared by BLE, Inc for specific discussion and data pertaining to the hydrogeological characteristics of the site. A copy of the report is included in the Permit to Construct Report for MSW Phases 3 & 4. There is a minimum separation of 6.0 feet between the seasonal high water elevations and 4.95 feet between bedrock elevations and the clay liner system for Phase 3.

1.3 Landfill Facilities

Haywood County currently has and will maintain the solid waste management facilities necessary for operating and maintaining the White Oak MSW Landfill. These facilities generally consist of a scalehouse, maintenance facility, MSW landfill, Land Clearing and Inert Debris Landfill, closed Construction and Demolition Landfill (C&DLF), leachate storage lagoon, a small Type 2 Composting Facility, and a Grinding and Mulching Treatment and Processing Facility. Future facilities planned include a methane gas collection system, power generation facility, a convenience center drop-off location for residential waste and recyclables, a truck tire wash facility and a new landfill office and scale system. Haulers of waste materials will be directed by the scale attendant at the scalehouse to the proper disposal area. Additionally, landfill personnel will be on hand per the requirements listed in the Operations Plan to inspect loads to ensure proper segregation of wastes. Also, on-site signage will direct waste haulers to the correct disposal area. With the closure of the C&DLF, the MSW landfill is now receiving C&D wastes.

2.0 Landfill Construction

The Permit Amendment documents illustrate the grading associated with the operation of Phases 1-3. These documents include, but are not limited to, the following:

- Limits of grading,
- Location of borrow and stockpile areas,
- Existing landfill facilities,
- Limits of Phase 1-3,
- Proposed base grades of Phase 3,
- Proposed drainage layer grades for Phase 3,
- Proposed final grades of Phase 1-3,
- Location of access roads,
- Location of leachate collection piping, leachate force main, and leachate storage lagoon,
- Location of sediment basins and drainage structures,
- Location of stormwater segregation features,

- Proposed transitional contours for each phase of development, and
- Proposed cap system
- Details of landfill development

2.1 Grading

Sheets C3A through C5 of the Permit Amendment drawings show the grading limits for Phase 3. Soil borrow/stockpile areas are shown on Sheet C1.

2.2 Phase Limits

Sheet C1 shows the limits of Phases 1-3. The Phase 1-3 footprint is expected to provide disposal capacity until approximately 2017.

2.3.2 Base Grades of Phase

Sheet C3 shows the proposed top of clay grades for Phase 3. The subgrade elevations are located one and one-half (1.5) feet below the clay grades. The average seasonal high water table is located a minimum distance of eight feet below the proposed top of clay grades and thus six and one-half feet below the proposed base grades. This separation ensures that the post-settlement bottom elevation of the base liner system meets or exceeds the vertical separation requirements described in section .1624 (b) of the Solid Waste Management Rules. The average seasonal high groundwater levels are included on Sheet C3 and are described in detail in the Design Hydrogeologic Report prepared by BLE, Inc submitted as a separate document at the time the original Permit to Construct Report for MSW Phases 3 & 4 was submitted. The proposed separation will result in a minimum distance of ten feet between the ground water table and waste placed in the phase. The minimum slope of the phase floor will be 2.75 percent. The projected settlement rates are based on the estimates developed in the Design Hydrological Report and are shown on Sheet C21 of the Permit Amendment drawings.

2.4 Access Roads

Access roads for Phases 1-3are composed of a compacted subgrade overlain by six (6) inches of railroad ballast and six (6) inches of CABC. The locations of the access roads are shown on Sheets C3A through C6 of the Permit Amendment drawings. The roads have shoulders on both sides, with a drainage ditch on the landfill side. The interior ditch is sized to carry run-off for Phases 1-3 at the peak development.

2.5 Sediment Basins

Sheet C11 of the Permit Amendment drawings is the Final Erosion Control Plan and shows the location of the existing sediment control structures that will be utilized to restrain erosion for the operation and final cap construction of MSW Phases 1 -3. Existing sediment basin #2

will be the primary sediment control structure for controlling sedimentation associated with the construction of the scales and scalehouse. Sheet C5 is the Phase 3 Erosion Control Plan and shows how stormwater runoff and sedimentation is managed on the site. All of the sediment basins were sized for the fully-developed condition since the landfill has the greatest potential for producing runoff at the fully-developed condition when slopes are at their steepest. These basins will have the capacity to accommodate run-off from the 25-year, 24-hour storm event with excess capacity. The basins also act as stormwater detention structures.

2.6 Leachate Force Main and Storage Lagoon

Sheets C4 and C18 of the Permit Amendment drawings show the location of the existing leachate lagoon, existing leachate gravity sewers, and the Phase 3 leachate sump, pumping station, and force main constructed during the development of Phase 3. The pump stations located at the sump areas (at the northern margin of Phase 3) will pump leachate through approximately 150 l.f. of dual-contained force main to a gravity leachate sewer, then leachate will flow by gravity approximately 375 l.f. to a manhole located near the leachate storage lagoon, just north of Phase 1. Each leachate pump can pump 35 gpm when pumping alone and a total of 44 gpm will be realized when both pumps are operating simultaneously. The force main and gravity sewer combined can accommodate up to 1,009 gpm. The storage lagoon has an existing capacity of 642,000 gallons and was expanded during the construction of Phase 3 to provide a total of 1,017,000 gallons of leachate storage. An additional HDPE liner was added to the lagoon at this time.

2.7 Phase Closure

Sheet C6 of the Permit Amendment drawings shows the proposed final grades for Phases 1-3. The ultimate cap grades for the phases will be dependent upon the design of adjacent phases. Temporary slopes within the Phases 1-3 area will range from five (5) to thirty-three (33) percent. Ultimate final cap grades will range from five (5) to twenty-five (25) percent. Components of the proposed closure cap, from bottom to top, will include a 12-inch thick intermediate soil cover, followed by an eighteen inch (18") thick clay layer with a permeability not greater than 1.0×10^{-5} cm/sec, a 40-mil textured HDPE geomembrane, a double-sided, eight (8)-ounce geocomposite, and a twenty-four inch (24") thick vegetative/erosion layer.

3.0 Landfill Operation

Reducing the production of leachate is a primary concern for efficient, cost-effective operation. Efficient operation of the leachate collection and stormwater segregation systems is imperative. Transitioning between active and inactive portions of a phase can also drastically increase leachate production if not handled properly.

3.1 Leachate Collection System

Sheet C4 shows the location of the leachate sump area and the leachate collection pipes. The minimum slope of the phase floor will be 2.5 percent in order to maintain efficient drainage and reduce head heights on the HDPE liner. The grading of the phase floor will promote drainage to the sump areas. An eighteen (18)-inch HDPE pipe was used for each of the pump-housing side slope risers at the leachate pumping stations. There is a leachate head test well located at each sump.

There is one sump for the Phase 3 which includes two pumping stations. The sump is located at the northern margin of Phase 3. Leachate collection piping directs leachate to the sump and provides complete coverage of the phase floor. The main collection lines were constructed to a minimum slope of 2.7% and the lateral collection lines were constructed to a minimum slope of 1.5%. The lateral leachate collectors and main headers were placed in trenches, covered with washed stone, and surrounded with a geotextile to protect the pipes from clogging. The pipes were only placed in trenches on the phase floor. (See details, Sheets D1-D12). The portion of the pipes where the cleanouts are located lie on the side slopes and are covered with stone and protected with geotextile. These pipes lay flat against the side slopes. No trenching was performed on the side slopes. Cleanout risers were provided for all of the leachate piping where physically possible. The leachate that collects in the sump areas will be pumped through the dual-contained force main to the leachate storage lagoon located north of Phase 1.

3.2 Stormwater Segregation Features

The Phase 3 waste area is covered with a synthetic stormwater cover. The waste area is divided by a temporary stormwater control berm adjacent to the working face. The berm was constructed on top of the drainage layer and covered by the synthetic stormwater control liner. The location of the temporary stormwater control berm is shown on the filling sequence drawings, Sheets C13 through C17 of the Permit Amendment drawings. This berm will direct stormwater runoff away from the working face to the low point in the cell, where a stormwater pump will pump the runoff over the northern Phase 3 perimeter berm. As waste placement continues, the elevation of the active area of the phase will reach the point where stormwater runoff can be directed over the perimeter berms on the north and west sides to ditches leading to sediment basins west and north of Phase 3.

3.3 Transition Between Active and Inactive Areas of the Phase

Placement of waste in Phase 3 will generally proceed from south to north. Prior to entering an inactive portion of the phase, the stormwater control liner will be partially removed. Where necessary, a temporary berm will be utilized to assure that stormwater and leachate remain separated. As the working face moves to the north, the stormwater control liner will remain in place as long as possible. See the detail sheets D1-D12 for a detail of the temporary gravel berm.

4.0 Facility Report

4.1 Waste Stream

Haywood County currently classifies their waste stream as industrial, commercial, municipal, or residential. Regulated hazardous waste, out-of-service area waste, and hazardous liquid wastes are prohibited at the White Oak Landfill. This is the classification for the waste currently being disposed of at the White Oak site. The waste stream for Phases 1-3 maintains the current classification.

The service area for the White Oak Landfill will include businesses and municipalities located within Haywood County in addition to the following North Carolina Counties: Avery County, Buncombe County, Burke County, Cherokee County, Clay County, Graham County, Henderson County, Jackson County, Macon County, Madison County, McDowell County, Mitchell County, Polk County, Rutherford County, Swain County, Transylvania County, and Yancey County. Waste from other counties will not be accepted at the facility. The current approved waste stream is approximately 79,200 tons per year. The average waste stream expected for Phases 1-3 is estimated to be approximately 146,000 tons per year over the life of the area.

The County will operate Phases 1-3 using basically the same equipment available to them at this time plus any additional equipment required to handle the increased waste stream. This present equipment basically includes a compactor, one excavator, one motor grader, and one dozer. This equipment should be sufficient for operating the landfill under its current waste stream.

4.2 Landfill Capacity

Final and intermediate cap contours are shown on Sheet C6 of the Permit Amendment drawings. Final cap contours are included for MSW Phase 1, the east side of MSW Phase 2 and the north and east sides of MSW Phase 3. Intermediate cap contours are shown on the west side of MSW Phases 2 and 3. MSW Phases 1-3 has a total available air space capacity for the disposal of wastes, as measured from the top of the drainage/protective cover layer to the bottom of the final or intermediate cap, of 2,623,963 cubic yards. This volume includes air space that is available for placing waste and operational daily cover; cap volumes are not included in the total available air space volume. From the opening of the White Oak Landfill in October of 1993 through February 29, 2012, Haywood County has disposed of approximately 853,079 tons of waste, utilizing approximately 1,576,850 cubic yards of air space. Therefore, the remaining available air space for the disposal of waste is 1,047,113 cubic yards. At the permitted rate of 146,000 tons of disposed waste per year, and utilizing the historic waste compaction rate for the White Oak Landfill of 1,082 pounds per cubic yard, the estimated life expectancy of MSW Phases 1-3 is approximately 4.1 years. Since the tonnage of waste received/disposed per year is not expected to immediately reach 146,000

tons per year, the overall life expectancy of Phases 1-3 is anticipated to increase to approximately five (5) years.

The following nominal operation and cap construction quantities for the remaining lifetime of MSW Phases 1-3 have been estimated:

	MSW Phases 1-3
Daily cover materials	225,000 cy
Intermediate Cover Soils	58,000 cy
Clay Liner Soils	50,000 cy
Vegetative Cover Soils	66,000 cy

Soil cover volumes were calculated assuming a soil to waste ratio of one (1) to five (5). MSW Phases 1-3 will require an average of 45,000 cubic yards of cover soils each year, based on a one (1) to five (5) soil to waste ratio. Approximately 5,000 cubic yards of soil would be needed each year for intermediate cover. Therefore, a total of 50,000 cubic yards of soil will be needed on an annual basis. The closure soil quantities needed for constructing the final cap for Phases 1-3 will include 30,000 cubic yards of intermediate cover soils, 50,000 cubic yards of clay liner material, and 66,000 cubic yards of vegetative support soil. Soils needed for construction and operation of Phases 1-3 will be taken from the soil borrow areas indicated on Sheet C1. Preliminary soil borings performed on the site indicated that earthen materials, which meet the project specifications for the compacted clay liner, are available in sufficient quantities.

4.3 Environmental Control System

The North Carolina Solid Waste Management Rules, Section .1600, entitled "Requirements For Municipal Solid Waste Landfill Facilities", were adhered to throughout the design of Phase 3.

The major component of the Environmental Control System for Phase 3consists of a primary composite base liner constructed of a geosynthetic clay liner (GCL), which consists of an 18-inch, low-permeability clay layer with a permeability not greater than 1.0×10^{-5} overlain with a GCL material with a demonstrated hydraulic conductivity of not more than 5×10^{-9} cm/sec under the anticipated confining pressure. The 18-inch clay layer and GCL were overlain with a 60-mil HDPE geomembrane. Once a protective 16-ounce geotextile was placed on the primary HDPE geomembrane, a two (2)-foot gravel drainage layer including leachate collection piping was placed on top of the composite base liner system. The composite base liner provides a redundant system for assuring that leachate is contained within the phase and does not affect local hydrogeology. The high hydraulic conductivity of the drainage layer assures quick and efficient removal of leachate from the phase floor to the sump areas thereby reducing the leak potential by reducing the driving head on the geomembrane. Once leachate reaches the sump area, it is transported to the leachate storage lagoon through a dual-contained leachate force main and gravity sewer. Leachate pumps located in the sump are

activated by head heights of less than twelve (12) inches. Disposal of leachate from the leachate storage lagoon is discussed in detail in the Operations Plan.

Stormwater in Phase 3 that does not come into contact with waste will initially be collected on top of the proposed stormwater control liner and pumped to a pipe that discharges into the unnamed branch north of the Phase. As the landfill increases in height, stormwater will be directed to periphery ditches that lead to permanent sediment basins prior to discharge to the nearby unnamed branch. Refer to sheets C5 and C11 of the Permit Amendment drawings.

4.4 Leachate Generation

The amount of leachate that Phase 3 & proposed Phase 4 (as shown on the original Permit to Construct drawings) will generate was estimated by using the HELP Model analysis included in Section 10 of the original Permit to Construct Report for Phases 3 & 4 and by examining landfill records for the past six years. See Section 11 of the original Permit to Construct for Phases 3 & 4 for landfill leachate records for the past six years. The HELP model analyzed ten stages of landfill development during the lifetime of Phase 3 & proposed Phase 4. Each stage of development was comprised of cross-sections of landfill construction, which included clay barrier soils, flexible membrane liners, gravel drainage layers and layers of compacted MSW wastes and cover soils. The stages of development varied from the first, which analyzed the landfill with only a small portion active with relatively thin layers of compacted waste, to the tenth, which analyzed the landfill after the final cap was installed. Stages 1 through 5 occurred during the development of MSW Phase 3 and stages 6 through 10 occurred during the development of proposed MSW Phase 4. The HELP model estimates that average monthly leachate production will reach 596,400 gallons/month during the initial stages of the proposed Phase 4 development. Landfill records over the past six years show an average monthly leachate generation of approximately 220,000 gallons per month, and 323,500 gallons/month for F.Y. 2005, the wettest year during the past six years. The highest total leachate production for a calendar month was 486,000 gallons in September 2004, although during a 30 day period in September and October of that year, 600,000 gallons of leachate were removed. This anomaly was due to two separate hurricanes, Ivan and Francis, that impacted the area in an approximate two-week period in 2004. The monthly average calculated by the HELP model for 15.5 acres of lined landfill was the same as the greatest actual observed leachate production for a 21.5-acre area of lined landfill. During the six-year time period, there were only 4 months where leachate generation exceeded 400,000 gallons (for 21.5 acres). The HELP Model analysis is a conservative estimate of leachate production and will continue to be considered when designing improvements to the landfill leachate system; however, leachate production records will be utilized as well. The leachate collection system must be prepared to handle extreme events as well as function efficiently at average production levels.

4.5 Average Leachate Production Flows and Pumping

Utilizing the existing leachate production information included in Section 11 of the original Permit to Construct for Phases 3 & 4, and pro-rating those quantities over the 15.5-acre footprint of Phase 3 and proposed Phase 4, it is estimated that Phases 3 and 4 will produce leachate at an average monthly rate of 250,000 gallons. Applying a 1.5 safety factor to this quantity results in an average rate of 375,000 gallons per month. To remove the leachate from the phase, assume that on average each pump will operate for 8 hours per day, which requires that the pumps remove leachate at an average flow of 13 gpm. Applying a peaking factor of 2 to the flow calculations, it is necessary for each pump to remove leachate at the rate of 26 gpm. An additional safety factor was incorporated into the pumping system; therefore, each pump was designed to pump 35 gpm at 25.5 feet total dynamic head (TDH). The pumps utilize a 3"x 6" dual-contained force main located along the northern margin of Phase 3, which runs for approximately 150 l.f. to a point where the force main discharges into the leachate collection system gravity sewer manhole #2. The gravity sewer flows approximately 375 l.f. where it discharges to the leachate collection system gravity manhole #1, just upstream of the leachate storage lagoon. See Sheet C18 for the leachate force main and gravity sewer piping. The leachate storage lagoon located north of Phase 1 has a total storage volume of 1,017,000gallons. Refer to Appendix A for force main calculations and Appendix B for correspondence with the Town of Waynesville concerning disposal of leachate.

4.6 Contingency Plan For Peak Flow Conditions And Leachate System Disruption

In the event of an extreme rainfall event, the HELP model projected a peak leachate production of 30,950 cubic feet/day, or approximately 231,000 gal/day. This peak event would be realized at Stage II of landfill development within the first two years of operation of Phase 3. Over time, the effects of an intense storm event would be greatly dampened due to the increase in the length of time that it would take stormwater to percolate through the layers of waste and daily cover. The available storage volume below the perimeter liner edge elevation of 2515 is approximately 2,200,000 gallons. During the peak event as described by the HELP model, the landfill can contain leachate for approximately 10 days of peak discharge intensity. It is unlikely that the HELP model 1-day peak intensity rate would continue for 10 days. Therefore it is highly unlikely for the landfill to produce more leachate than the pumps can transport to the leachate lagoon. In the event of extreme conditions, the discharge from the County's stormwater removal pump may be diverted to manhole 2 of the leachate gravity system, which will allow leachate to be pumped to the storage lagoon at approximately 300 gpm.

Under average operating conditions, in the event that there was a temporary failure with any of the leachate removal and storage equipment, the geometry of the landfill would allow for the landfill to contain the leachate for a period of several months. However, the system should never be out of operation for more than a few hours, and then only under extreme circumstances. Due to the conservative design of the leachate removal and storage equipment and the geometry of the landfill, the possibility of leachate buildup overflowing the perimeter berm is very low.

In conjunction with the development of Phase 3, the existing leachate lagoon was raised and a new liner installed on top of the existing liner. The lagoon was raised by approximately 3.25' in order to provide an additional 375,000 gallons of storage volume. During the construction of the additional storage volume, a new 60-mil textured HDPE liner was installed over the existing liner. A double-sided geocomposite was installed between the existing liner and the new liner. The final volume of the lagoon is approximately 1,017,000 gallons.

Section .1624 (2)(A)(ii) of the Solid Waste Management Rules states that "the geometry of the landfill shall be designed to control and contain the volume of the leachate generated by the 24-hour, 25-year storm." The input parameters of the HELP model included maintaining a minimum head of one (1) foot on the geomembrane liner, and the additional calculations have been performed to assure that rule .1624 (2)(A)(ii) was met.

4.7 Soil Resources

It was estimated that the construction of Phase 3 would require 300,000 cubic yards of cut and 80,000 cubic yards of fill material resulting in the need to stockpile approximately 220,000 cubic yards of soil.

The total soil requirement for Phase 3 construction included 21,300 cubic yards of soil liner material. The soil stockpile area consisted of materials suitable for structural fill as well as clay liner material. On-site borrow areas are located south and west of existing Phase 2 as shown on sheet C1 of the Permit Amendment drawings.

The County has enough soil available to operate Phases 1-3 through final build-out.

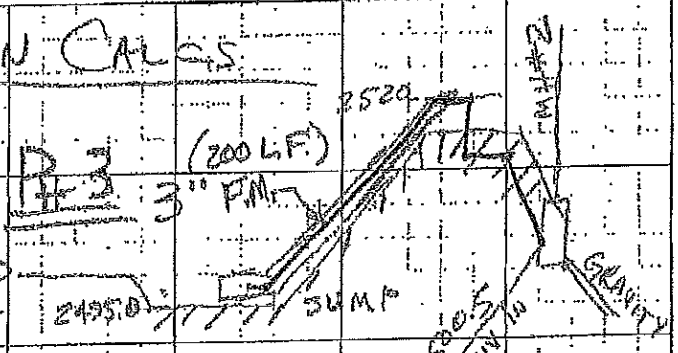
APPENDIX A

Leachate Force Main Calculations

McGill ASSOCIATES
Engineering • Planning • Finance
McGill Associates, P.A. P.O. Box 2259, Asheville, NC 28802
55 Broad Street, Asheville, NC 28801 828-252-0575 Fax 828-252-2518

PROJECT: W.O.L.F. – PH 3 & 4
PROJECT NO.: 07578
DESCRIPTION:
CALCULATED BY: DP CHECKED BY:
DATE: 8/25/08 SHEET NO. OF

FORCE MAIN CALCS



PH #3 (200 L.F.) 3" FM

STATIC HEAD

2529 – 2495.5 = 24.5'

PUMP ON: 2496.0
PUMP OFF: 2495.5
BOTH PUMPS ON: 2498.5

FRICTION LOSSES

FROM FIG 28, USE 0.35 LOSS/100', OR TOTAL OF 0.70'
(C = 120) (V = 2 FT/SEC)
ASSUME FITTINGS LOSS ≈ 0.2'
TOTAL FRICTION = 1'

EACH PUMP @ 26 gpm @ 25.5' T.D.H.

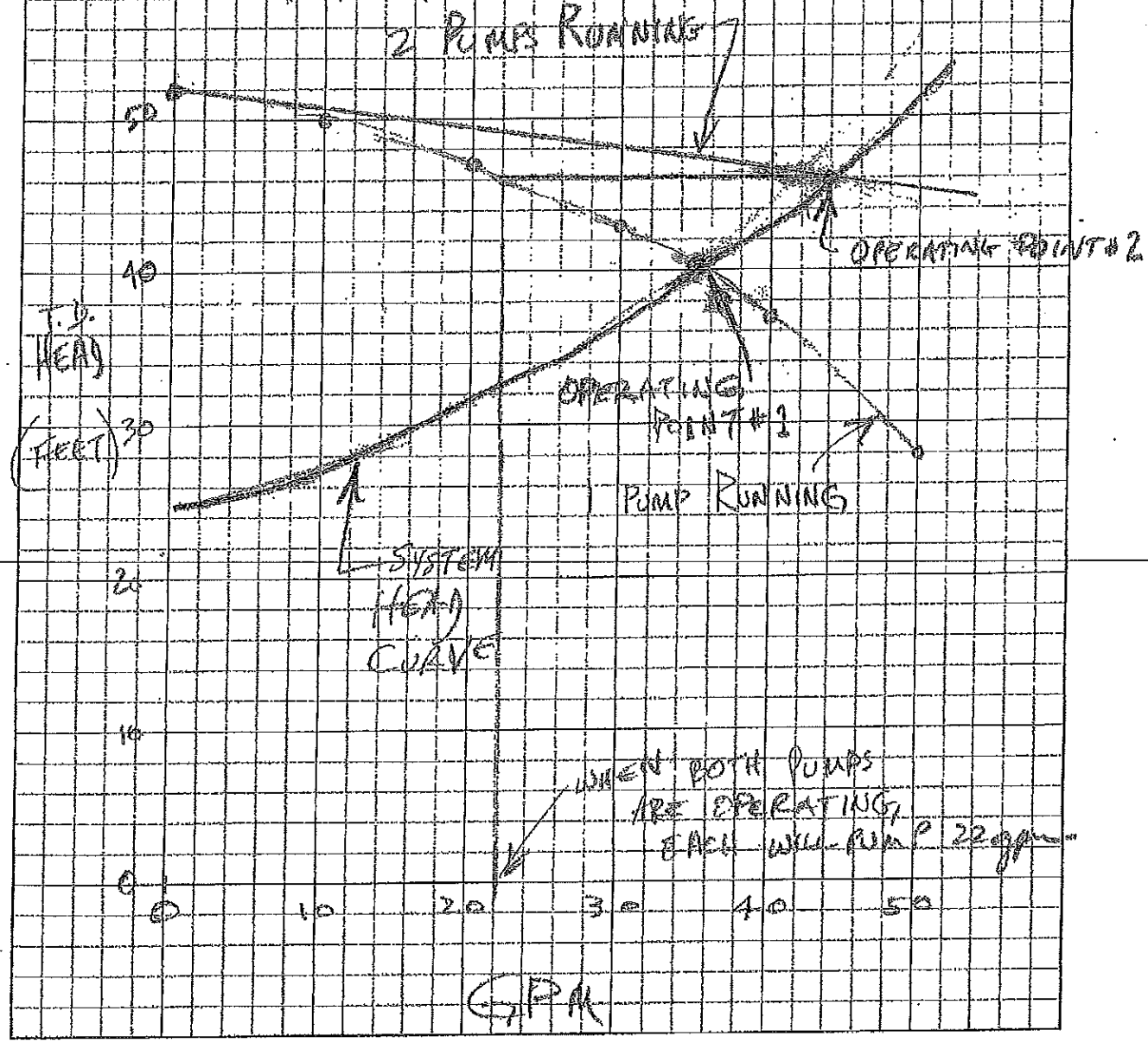
USE 35 gpm (REVISED 2/27/09)

McGill ASSOCIATES
Engineering • Planning • Finance
McGill Associates, P.A. P.O. Box 2259, Asheville, NC 28802
55 Broad Street, Asheville, NC 28801 828-252-0575 Fax 828-252-2518

PROJECT:
PROJECT NO.:
DESCRIPTION:
CALCULATED BY: DP CHECKED BY:
DATE: 12/27/09 SHEET NO. OF

PUMP CALCS

NOTE: EPG SERIES & SURE PUMP MODEL 812, 0.75 h.p. USED FOR PUMP CURVE, PUMPS ARE IDENTICAL



PUMP WORLD

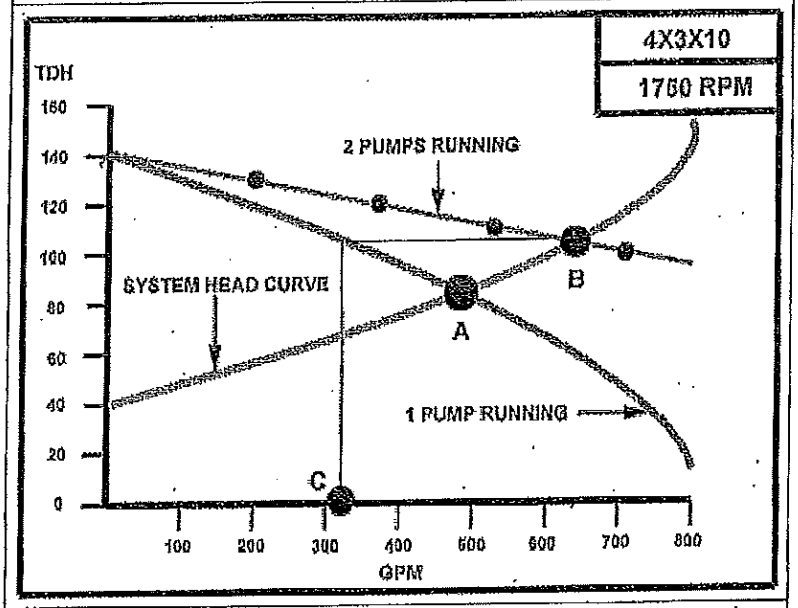
Pump Tutorial CDROM $19.95

Ads by Google
Sewer Pumps
Priming Pump
Pump Head
Pump Curve
Pump Catalog

Identical Pumps

Identical Pumps

Operating two identical pumps in parallel the assumption is made that the flow will double. This however is not the case. In order to calculate the additional flow realized by running two identical pumps in parallel the following calculations must be made.



First let's look at the pump curve and system head curve with one pump running.

TDH	FLOW
130'	100 GPM
120'	190 GPM
110'	280 GPM
100	360 GPM
OPERATING POINT (A)	
85'	470 GPM

Second let's look at the pump curve and system head curve with two pumps running.

TDH	FLOW

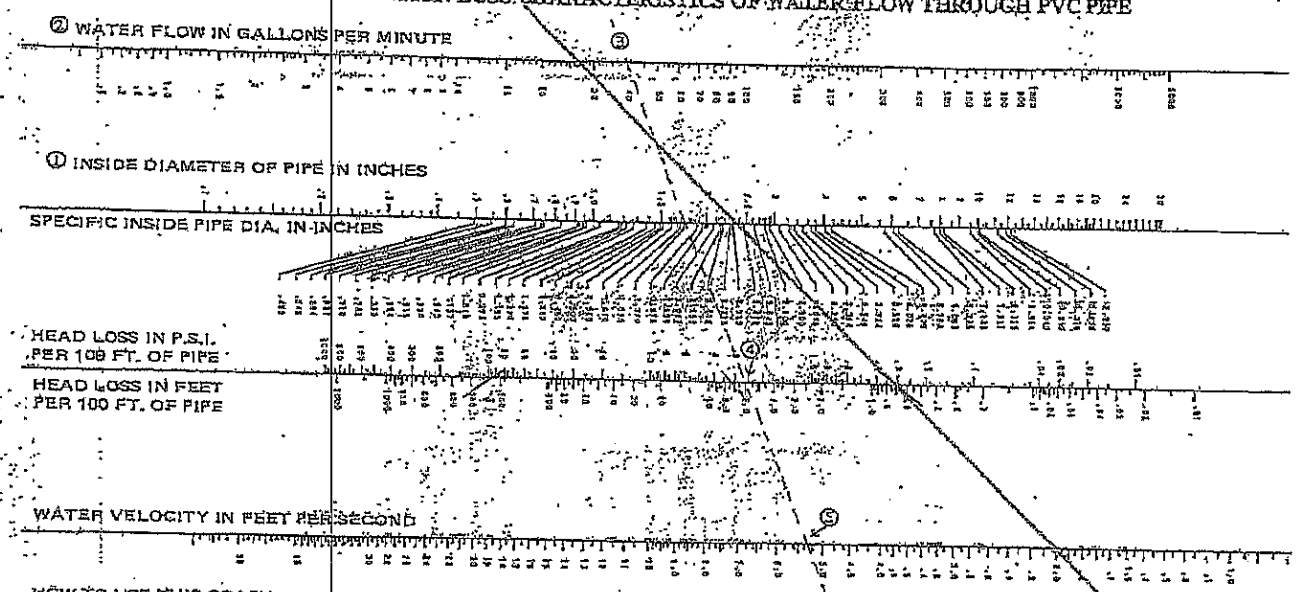
130'	200 GPM
120'	380 GPM
110'	560 GPM
100	720 GPM
OPERATING POINT (B)	
105'	660 GPM

The addition of the second identical pump produces and extra 190 GPM and does not double the flow. Point C is the flow produced by each pump when both pumps are running.

32989 Scenic Cove
Millsboro, DE 19966

Send mail to webmaster@pumpworld.com with questions or comments about this web site.
Copyright © 1998-2008 Pump World

FIGURE 26 -- FRICTION LOSS CHARACTERISTICS OF WATER FLOW THROUGH PVC PIPE



HOW TO USE THIS GRAPH:

1. Select the desired pipe size (inside diameter).
2. Determine the amount of water to flow through the pipe.
3. Place a straight-edge on these two points.
4. The point at which the straight-edge intersects the head-loss line and the velocity line give these two values under the given conditions.

EXAMPLE:

- 1½" schedule A pipe (I.D. = 1.740") ①
- 40 gallon per minute service ②

1. Line up these points with a straight-edge ③
2. Read 2.6 psi (or 6 ft.) from the head-loss line ④
3. Read 5.38 ft. per second from the velocity line ⑤

THE VALUES ON THIS GRAPH ARE BASED ON THE WILLIAMS AND HAZEN FORMULA:

(EQUATION 80) $f = .2083 \left(\frac{100}{C}\right)^{1.85} \times \frac{Q^{1.85}}{d_i^{4.8655}}$

WHERE:

f = friction head, in feet of water per 100 feet of pipe

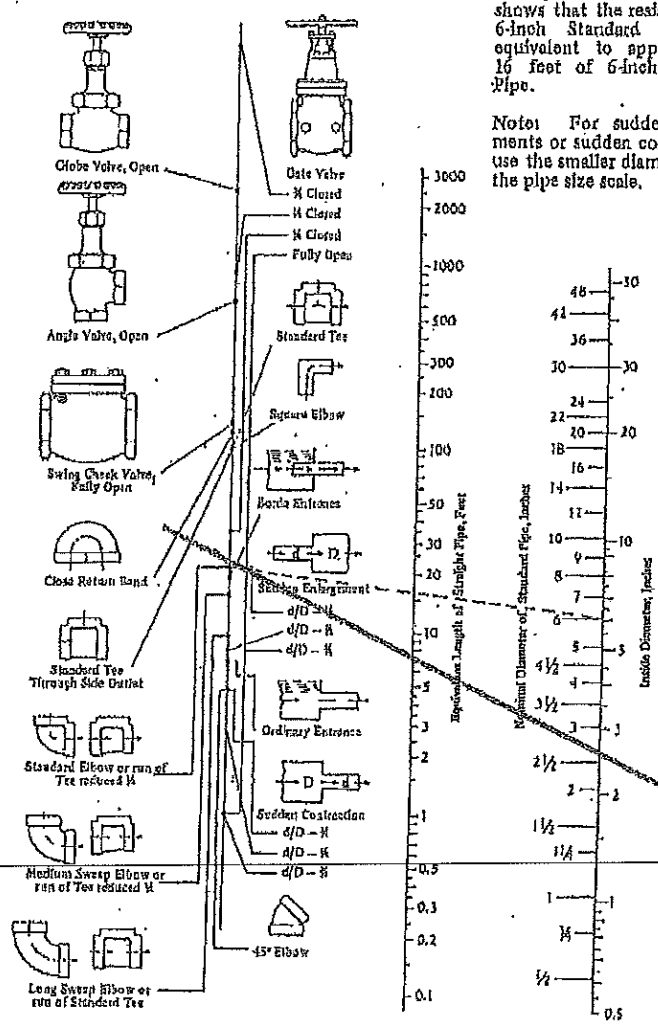
d_i = inside diameter of pipe in inches

Q = Flow in gallons per minute

C = Constant for inside roughness of pipe (150 for PVC)

FIGURE 27 – RESISTANCE OF VALVES AND FITTINGS TO FLOW OF FLUIDS

Note: Head loss through check valves varies with types manufactured. Consult manufacturer for correct values.



Example: The dotted line shows that the resistance of a 6-inch Standard Elbow is equivalent to approximately 16 feet of 6-inch Standard Pipe.

Note: For sudden enlargements or sudden contractions, use the smaller diameter, d, on the pipe size scale.

ASSUME 6 TOTAL ELBOWS OR 8'x6 EQ LENGTH = 50'

APPENDIX B

Leachate Acceptance Permit from Town of Waynesville WWTF

Leachate Acceptance Agreement from the Town of Maggie Valley

Town of Waynesville

January 19, 2005

Mr. Bobby Cogdill
Solid Waste Director
Haywood County Solid Waste Management
278 Recycle Road
Clyde, NC 28721

Re: Transmittal Letter for IUP Permit No. 0003
White Oak Sanitary Landfill

Dear Mr. Cogdill:

Your Industrial User Pretreatment Permit (I. U. P. #0003) is enclosed. This permit renewal is issued in response to your Industrial User Wastewater Survey and Application which was dated January 7, 2005.

This permit is issued pursuant to the requirements of North Carolina General Statute 143-215.1 and the local Sewer Use Ordinance.

Please read this permit carefully.

If any parts, measurement frequencies, or sampling requirements contained in this permit are unacceptable to you, you have the right to an adjudicatory hearing upon written request within thirty (30) days following receipt of this letter. Unless such demand is made, this decision shall be final and binding.

Sincerely,

Frederick L. Baker, P.E.
Director of Public Works

FLB:fr

cc: Waynesville Waste Water Treatment Plant

Enclosure: IUP #0003

POB 100, 16 SOUTH MAIN ST., WAYNESVILLE, NC 28786 • PHONE (828) 456-3515 • FAX (828) 456-2000

Town of Waynesville

December 20, 2004

Mr. Bobby Cogdill
Haywood County Solid Waste Management
278 Recycle Road
Clyde, NC 28721

Re: IUP 0003, White Oak Sanitary Landfill

Dear Mr. Cogdill:

Just a couple of reminders. The referenced permit expires June 30, 2005. Get your annual leachate monitoring report submitted for metals and VOCs, pH, TSS, BOD, Ammonia, Sulfide and COD. File for your permit reissuance in January using the attached application. The application fee is $200.

The user fee for hauled wastewater from White Oak is $1.82/gallon or $109.20 per load for the 6,000 gallon tanker capacity. I anticipate that after June 30, 2005 the FY 06 budget ordinance will include a five percent (5%) increase to $114.66/load. Please plan accordingly during your budget preparations.

Thank you. We appreciate your business.

Sincerely,

Frederick L. Baker, P.E.
Public Works Director

FLB:pm

Attachment

PO B 100, 16 SOUTH MAIN ST., WAYNESVILLE, NC 28786 • PHONE (828) 456-3518 • FAX (828) 456-2000

Town of Waynesville

WAYNESVILLE WASTEWATER TREATMENT PLANT

NON S.I.U.
INDUSTRIAL USER PRETREATMENT PERMIT (IUP)
To Discharge Wastewater Under The
Industrial Pretreatment Program

Effective Date: July 1, 2005 Permit No. 0003

Expiration Date: June 30, 2010

In compliance with the provisions of the Town of Waynesville Sewer User Ordinance, North Carolina General Statute 143-215.1, other lawful standards and regulations promulgated and adopted by the North Carolina Environmental Management Commission, and the Town of Waynesville, the following Industry, hereafter referred to by name or as the permittee:

Haywood County Solid Waste Management
278 Recycle Road
Clyde, NC 28721

White Oak Sanitary Landfill
White Oak Road
Fines Creek, NC

is hereby granted permission to:

1) Discharge hauled wastewater from the leachate from the White Oak Landfill into the Town of Waynesville WWTP NPDES No. NC 0025321 in accordance with the effluent limitations, monitoring requirements and all other conditions set forth in Parts I, II and III of this Industrial User Pretreatment Permit (IUP).

2) Continue operation of the existing pretreatment facility consisting of flow equalization storage and collection pond located at the White Oak site.

3) After receiving authorization to construct from the Town of Waynesville, construct and operate additional pretreatment units as needed to meet permit requirements.

DATE: 1/19/05

Frederick L. Baker, P.E.
Director of Public Works

POB 100, 16 SOUTH MAIN ST., WAYNESVILLE, NC 28786 • PHONE (828) 456-3515 • FAX (828) 456-2000

PART I - EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. Description of IUP Discharge

Pipe	Description
001	The sewer tap for the Recycle Road, Materials Recovery Facility is pipe 001. Hauled wastewater from the leachate pond for the White Oak Landfill, a lined, baled municipal solid waste landfill is discharged only at the MRF.

2. Effluent Limits and Monitoring Requirements

Effective immediately and lasting to the expiration date of this permit, the permittee may discharge from pipe 001 according to these specific effluent limits and monitoring requirements.

Limited Parameter	Effluent Daily Max. Lbs.day	Limitation Monthly Avg.	Sample Type	Monitoring Frequency Permitee
Flow	30,000 gpd	25,000 gpd	Influent Waste Tracking Log	Every Truckload
pH	*SU		Grab	Quarterly
BOD	**		Composite	Annual
TSS	**		Composite	Annual
Ammonia	**		Composite	Annual
Sulfide	**		Composite	Annual
COD	**		Composite	Annual
***Metals	**		Composite	Annual
****Volatile Organics	**		Composite	Annual

* pH shall be greater than 6.0 and less than 9.0
** not currently limited, monitoring only
*** 15 metals listed in Appendix I, 40 CFR Part 258
**** 47 volatile organics listed in Appendix I, 40 CFR 258

3. Definition of Terms

A) A "composite" sample, for monitoring requirements is defined as a minimum of four (4) grab samples collected at equally spaced two (2) hour intervals and proportioned according to flow.

B) A "grab" sample, for monitoring requirements, is defined as a single "dip and take" sample collected at a representative point in the discharge stream.

C) A "daily" monitoring frequency shall mean each day a discharge occurs.

PART II - GENERAL CONDITIONS

1. **Representative Sampling**

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other wastestream, body of water, or substance. Monitoring points shall not be changed without notification to, and approval by, the POTW Director.

2. **Reporting**

A) Monitoring results obtained by the permittee shall be reported on forms specified by the Town, postmarked no later than the twentieth day of the month following the month in which the samples were taken. If no discharge occurs during a reporting period (herein defined as each calendar month) in which a sampling event was to have occurred, a form with the phrase " no discharge" shall be submitted. Copies of these and all other reports required herein shall be submitted to the Town of Waynesville at the following address: Town of Waynesville Industrial Pretreatment Program, Post Office Box 100, Waynesville, NC 28786.

B) If the sampling performed by the permittee indicates a violation, the permittee shall notify the Town within 24 hours of becoming aware of the violation. The permittee shall also repeat the sampling and analysis and submit the results of the repeat analysis to the Town within 30 days after becoming aware of the violation.

3. **Test Procedures**

Test Procedures for the analysis of pollutants shall be performed in accordance with the techniques prescribed in 40 CFR part 136 and amendments thereto unless specified otherwise in the monitoring conditions of this permit.

4. **Additional Monitoring by Permittee**

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be submitted to the Town. The Town may require more frequent monitoring of the monitoring of other pollutants not required in this permit by written notification.

5. **Duty to Comply**

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Town of Waynesville Sewer Use Ordinance and is grounds for possible enforcement action.

6. **Duty to Mitigate - Prevention of Adverse Impact**

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health, the POTW, the waters receiving the POW' s discharge, or the environment.

7. **Facilities Operation, Bypass**

The permittee shall at all times maintain in good working order and operate as efficiently as possible, all control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Bypass of treatment facilities is prohibited except when approved in advance by the Town. Bypass approval shall be given only when such bypass is in compliance with 40 CFR 403.17.

8. **Removed Substances**

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutants from such materials from entering the sewer system. The permittee is responsible for assuring its compliance with any requirements regarding the generation, treatment, storage and/or disposal of "Hazardous waste" as defined under the Federal Resource Conservation and Recovery Act.

9. **Upset Conditions**

An "upset" means an exceptional incident in which there is an unintentional and temporary noncompliance with the effluent limitations of this permit because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed or inadequate treatment facilities, lack of preventative maintenance, or careless or improper operations.

An upset may constitute an affirmative defense for action brought for the noncompliance. The permittee has the burden of proof to provide evidence and demonstrate that none of the factors specifically listed above were responsible for the noncompliance.

10. **Right of Entry**

The permittee shall allow the staff of the State of North Carolina Department of Environment, Health, and Natural Resources, Division of Environmental Management, the Regional Administration of the Environmental Protection Agency, the Town of Waynesville, and /or their authorized representatives, upon the presentation of credentials:

A) To enter upon the permittee's premises where a real or potential discharge is located or in which records are required to be kept under the terms and conditions of this permit; and

B) At reasonable times to have access to and copy records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

11. Availability of Records and Reports

The permittee shall retain records of all monitoring information, including all calibration and maintenance records as well as copies of reports and information used to complete the application for this permit for at least three years. All records that pertain to matters that are subject to any type of enforcement action shall be retained and preserved by the permittee until all enforcement activities have concluded and all periods of limitation with respect to any and all appeals have expired.

Except for data determined to be confidential under the Sewer Use Ordinance, all reports prepared in accordance with terms of this permit shall be available for public inspection at Town Hall. As required by the Sewer Use Ordinance, effluent data shall not be considered confidential.

12. Duty to Provide Information

The permittee shall furnish to the Director of Public Works or his/her designees, within a reasonable time, any information which the Director, his/her designee, or the Division of Environmental Management may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish, upon request, copies of records required to be kept by this permit.

13. Signatory Requirements

All reports or information submitted pursuant to the requirements of this permit must be signed and certified by a ranking official or duly authorized agent of the permittee.

14. Toxic Pollutants

If a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Federal Clean Water Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit may be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

15. Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

16. **Federal and/or State Laws**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable Federal and/or State law or regulation.

17. **Penalties**

The Sewer Use Ordinance of the Town of Waynesville provides that any person who violates a permit condition is subject to a civil penalty not to exceed $10,000 dollars per day of such violation.

Under state law, (NCGS 143-215.6B), under certain circumstances it is a crime to violate terms, conditions, or requirements of pretreatment permits. It is a crime to knowingly make any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance. These crimes are enforced at the prosecutorial discretion of the local District Attorney.

18. **Need to Halt or Reduce not a Defense**

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the conditions of the permit.

19. **Transferability**

This permit shall not be reassigned or transferred or sold to a new owner, new user, different premises, or a new or changed operation without approval of the Town.

20. **Property Rights**

This permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

21. **Severability**

The provisions of this permit are severable and, if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

22. **Permit Modification, Revocation, Termination**

This permit may be modified, revoked and reissued or terminated with cause in accordance to the requirements of the Town of Waynesville Sewer Use Ordinance and North Carolina General Statute or implementing regulations.

23. **Re-Application for Permit Renewal**

The permittee is responsible for filing an application for reissuance of this permit at least 180 days prior to its expiration date.

24. **Dilution Prohibition**

The permittee shall not increase the use of potable or process water or in any other way attempt to dilute the discharge as a partial or complete substitute for adequate treatment to achieve compliance with the limitations contained in this permit.

25. **Reports of Changed Conditions**

The permittee shall give notice to the Town of any planned significant changes to the permittee's operations or system which might alter the nature, quality, or volume of its wastewater at least 180 days before the change.

26. **Construction**

No construction of pretreatment facilities or additions thereto shall be begun until Final Plans and Specifications have been submitted to the Town and written approval and an Authorization to Construct (A to C) have been issued.

27. **Reopener**

The permittee shall be modified or, alternatively, revoked and reissued to comply with any applicable effluent standard or limitation for the control of any pollutant shown to contribute to toxicity of the WWTP effluent or any pollutant that is otherwise limited by the POTW discharge permit. The permit as modified or reissued under this paragraph may also contain any other requirements of State or Federal pretreatment regulations then applicable.

28. **Categorical Reopener**

This permit shall be modified, or alternatively, revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 302(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

A) contains different conditions or is otherwise more stringent than any effluent limitation in this permit; or

B) controls any pollutant not limited in this permit.

This permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

29. **General Prohibitive Standards**

The permittee shall comply with the general prohibitive discharge standards in 40 CFR 403.5(a) and (b) of the Federal pretreatment regulations.

30. **Reports of Potential Problems**

The permittee shall notify by telephone the POTW Superintendent, (828) 452-4685, immediately of all discharges that could cause problems to the POTW including any slug loadings as defined by 40 CFR 403.5(b). If the permittee experiences such a discharge, they shall inform the POTW Superintendent immediately upon the first awareness of the commencement of the discharge. Notifications shall include location of the discharge, type of waste, concentration and volume if known and corrective actions taken by the permittee. A written follow-up report thereof shall be filed by the permittee within five (5) days, unless waived by the Town.

Part III – SPECIAL CONDITIONS

1. **Hauled Industrial Waste, Waste Tracking Form**

In accordance with Section 2.9 of the Town's SUO, Industrial Waste Haulers must provide a wastetracking form for every load. Participation in the user charge system will be on the basis of a fee per load (currently $1.82/gallon of tanker capacity or as modified by the schedule of fees and charges adopted in the Town's annual budget ordinance) paid monthly based on the waste tracking form log.

2. **Local Permit (NON SIU)**

This permit is classified non significant industrial use (non-SIU) because flows are less than 25,000 gpd and no pollutants of concerns exceed 5% of the MAIL (maximum allowable industrial loading.)

Part IV – PERMIT MODIFICATION HISTORY

1. The original permit was issued in 1995 and renewed in 2000.

2. In January 2005, the permit is renewed for five years effective July 1, 2005. The daily maximum flow is increased to 30,000 gpd (from 25,000) to accommodate five (5) truckloads per day of leachate. The monthly average limitation for flow increased to 25,000 gpd (from 18,000 gpd). Ph monitoring frequency is reduced to quarterly (from monthly). This local permit uses an annual scan type analysis suited for solid waste leachate and priority pollutants. All pollutants of concern remain well below 5% of MAIL.

V1089 11079 24470-89913-47102

An Agreement Between Haywood County and the Town of Maggie Valley Regarding the Town accepting leachate from the White Oak Landfill at the Maggie Valley Wastewater Treatment Plant

This agreement will lay out the terms by which the Town of Maggie Valley will accept leachate from the Haywood County landfill.

- The Town agrees to accept leachate from the Haywood County White Oak landfill in an amount not to exceed 50,000 gallons per day.
- Haywood County will pay the Town $130.00 per load. Each load will be considered a tanker load of 6,000 gallons or less. Billing will be done on a weekly basis, and will be due within 30 days of the bill date. Each year the price per load may be adjusted by the CPI-W South Urban Non-Metropolitan rate as calculated by the Bureau of Labor Statistics on the March to March rate.
- Haywood County agrees to unload the tanker at the manhole as designated by the Town's Public Works Director. Whenever a load is delivered to the Town, the driver of the tanker must sign the log to indicate a load has been delivered. The Town prefers to receive leachate in the morning, however, will accept it at all times, unless circumstances prevent the plant from being able to accept it.
- The Town agrees to provide adequate space to maneuver the tanker to get to its unloading position.
- Haywood County agrees to pay for any damage that is done at the Maggie Valley Wastewater Treatment Plant that is attributable to the movement of the tanker.
- Haywood County will provide to the Town quarterly TCLP analysis of the leachate. The Town of Maggie Valley reserves the right to suspend accepting the leachate if the Town of Maggie Valley suspects that it may begin to negatively impact the Maggie Valley Wastewater Treatment Plant.

The Town of Maggie Valley and Haywood County will follow the terms of this agreement.

Timothy J. Barth
Representative of the Town of Maggie Valley

Representative of Haywood County